UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
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GUIDELINES
for
WILDLIFE HABITAT IMPROVEMENTS
in
OREGON GRAZING DISTRICTS

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PREFACE

District personnel should carefully analyze these guidelines for wildlife habitat and its improvement. This material is intended to supplement the Manual and bring under one cover usable information of value in conducting your range conservation and development program. This program of planned land and water treatments is designed to support multiple-use management of the Federal range. Wildlife, as one use, is the subject of increasing demands by the public.

Provision for wildlife should be made when planning development programs in the grazing districts and for any project special provision for habitat development should be noted on the Project Estimate Form 4-1208 under Remarks.

Our appreciation is expressed to the Divisions of Engineering, Forestry, and Lands in the Oregon State Office, and to the Oregon State Game Commission, for their critical review of relevant portions of these guidelines.

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INTRODUCTION

Consideration is the basic necessity for insuring maintenance of adequate wildlife habitat on the Federal range during this early-evolutionary stage of its management. Such consideration in routine, day to day matters which affect the public domain would be of the most fundamental and far-reaching benefit to this public resource. Conservation of remaining habitat now, will reduce future need for its rehabilitation.

Habitat development never replaces the need for habitat management. Unless sound management is practiced, expenditures for improvement are largely wasted.

Habitat improvements for wildlife, applicable to BLM ranges, are not materially different from recognized range improvement practices for livestock. Treatments that enhance the quality and quantity of vegetative cover and water are often beneficial to wildlife or, with a little modification, they easily could become multi-purpose. Detrimental effects can be minimized through consideration of wildlife habitat needs.

As we proceed with range development projects, the value of inter-agency cooperation and of constantly informing the public of plans and progress affecting wildlife habitat should not be underestimated.

These guidelines are intended to aid and encourage district personnel in consideration of wildlife while carrying out the Bureau's Soil and Moisture Conservation program which has its objectives (4310.4):

A. To promote management and use of the public lands in accordance with their optimum productive capabilities.

B. To treat the public lands in accordance with their needs for permanent protection, improvement and maintenance.

C. To restore depleted public lands to the peak of their productive capability and prevent further damage.

D. To rehabilitate the public lands damaged by wildfire for protection of soil and water resources and for reduction of erosion damage.

E. To control surface runoff in such ways as to promote water intake into the soil to provide for plant needs, sustained ground water levels, and to minimize downstream damage.

GENERAL GOALS

The value and importance of wildlife are recognized and its habitat requirements will be considered in the total natural resource management programs of the Bureau. (IX 8.1.7A)

The objective in wildlife management is to maintain, through cooperative efforts, the optimum numbers of wildlife on the public range and to keep them in balance with the needs for other public uses. (IX 8.1.5)

Special consideration will be given to wildlife for:

(1) Preservation of an endangered species where a special reservation of habitat may be necessary.

(2) Protection of certain key range areas where survival of a game herd requires that positive measures be taken to save the wildlife and range resource. (IX 8.1.7D)

Wildlife interests should be respected when planning and conducting all other phases of a resource development plan. Many range improvement practices can be beneficial to wildlife and most projects need cause minimum damage if dual uses are considered.

Wildlife habitat development should be integrated with other phases of a development project to the greatest practicable degree.

Basically, wildlife management as related to any range development project consists of: a) recognition of the species to be benefitted or controlled; b) determination of optimum, compatible population levels; c) knowledge of the species requirement; d) implementation of a development plan to improve inadequate habitat sufficiently to support desired populations through their seasons of use; e) control of undesirable or over-abundant species; f) future integrated management of the wildlife, vegetation, and other resources to maintain optimum multiple use of all resources.

COOPERATION

The Bureau has authority to cooperate with official State agencies engaged in conservation of wildlife on the public domain. (Sec. 9, Taylor Grazing Act).

Bureau policy is to obtain management of wildlife as it relates to public land use through full cooperation with individuals, other Federal agencies, and the respective States, recognizing the primary responsibility of the State in the wildlife management programs. (IX 8.1.4)

In carrying out the policy and general objectives the Bureau will work with other groups and agencies interested in wildlife to promote proper protection, development of habitat, and harvest of surplus numbers of wildlife species. (IX 8.1.7C)

Wildlife, with few exceptions, is owned and controlled by the States, whereas the Bureau is directly concerned with protection, development and management of the wildlife habitat on the public domain. Cooperation and coordination of effort are necessary on these lands. The district manager may enter into cooperative agreements for range improvement and development programs with the State. (IX 8.2.1 and 8.2.2)

The Bureau may cooperate in research projects sponsored by a State, Federal research agency or private group including, where feasible and within its appropriations, provision of land or water to be studied, and assistance in setting up and maintaining projects. (IX 8.2.3)

Suggested types of cooperation by agencies include the following:

State Game Commission. Source of facts regarding game animals, birds and fish; wildlife management plans (population controls, public access, land classification, water filings, range condition studies, habitat improvements, evaluation of range improvement practices); public information and education; and wildlife research.

Bureau of Sports Fisheries and Wildlife. Appropriate research projects (IX 8.2.3); predator and rodent control (IX 8.4.4); and certain management projects, such as for migratory birds. (IX 8.2.5)

Forest Service. Management changes affecting the other agencies operations, such as use of contiguous lands.

Soil Conservation Service. Foster wildlife habitat considerations and improvements on private lands, such as within a community watershed. Improving permittees' private ranges may indirectly benefit wildlife on public lands.

Federal Cooperative Extension Service. Public information and education activities relative to proper use of range land.

Agricultural Stabilization and Conservation Service. Encourage private operators to participate in ACP practices beneficial to wildlife.

Sportsmens organizations should be kept informed and invited to participate in habitat improvements. The Director's memorandum of 8/4/61, subject: "Solicitor's opinion - Cooperation with Sportsmen's groups", quotes the Solicitor's opinion that Section 2, Taylor Grazing Act, permits the Bureau to enter into cooperative agreements with sportsmen's organizations for the development of wildlife habitat on public lands.

District advisory boards should be fully apprised of wildlife plans and developments, and their cooperation should be encouraged.

LAND STATUS

It is not intended that measures described below are to be applied in any general manner. Specific instances will be considered individually and on their merits with due regard for other uses. Single-use management is not intended.

Land adjustments or classification for wildlife habitat improvement purposes might apply, among others, in the following situations:

Designation as unsuitable for disposal any key, or critical, portions of certain game ranges and choice fish habitat areas. These should be managed and developed primarily to benefit the wildlife species concerned.

Land exchanges with State or private owners aiming toward blocking up Federal ownership of areas identified in long range BLM management programs. (Public access to public lands or waters may be a principal reason for land exchanges).

Classification and transfer to the State, under authority of the R. & P. P. Act, appropriate areas, upon application.

The discretionary function of classification of vacant public lands must precede allowance of entry. State (i.e. Game Commission) requests signifying interest in wildlife habitat resources on public

lands must be considered in any classification action or other determinations authorized by statute. Recordation of these considerations is to be encompassed in the Master Unit plans. The Game agency should be a direct source of wildlife habitat resource data. In addition any changes must be added to the Master Unit plans. The classification procedures under 43 CFR 296 provide for the serving of decisions on interested agencies. Copies of decisions will be served on the State game agency involving all applications where the Master Unit plans or land investigations indicate a wildlife habitat consideration.

The Land Conservation Policy statement of 2/14/61 by the Secretary of the Interior sets up a public interest test for all transfers of land out of Federal ownership. In part, it states that:

> 2....Leases, sales or other disposition of public lands will not be made unless the lease or disposition will serve a sound public purpose, ...4. Lands which cannot properly be developed under existing public lands laws...will, wherever feasible, be retained in Federal ownership, pending the enactment of appropriate legislation. (V 1.20 Appendix III)

Master Unit System

The Master Unit System of land classification has as one objective orderly tenure adjustments in order to provide a sound basis for developing a sustained resource management program. The program relative to land tenure arrangements consists of a lands analysis and lands action program (V 6.3.3)

Instructions for initial analysis of the Master Unit include consideration of:

> Programs of any other Federal, State or local agencies which are interested in the area.
>
> Special interest groups, such as recreation and wildlife organizations. (V 6.3.11)

The detailed analysis leads to accomplishing land adjustments in support of Bureau program objectives, including exchanges to improve land patterns; and, classification and transfer of sites suitable for development under the R. & P. P. Act. (V 6.3.12)

The lands action program of the Master Unit system follows through with land tenure adjustments to facilitate planned management programs. This includes land exchanges to block up areas, transfer of title to lands not required for Federal land programs, and acquisition of lands with significant public value. (V 6.3.31)

It is recommended in accordance with these objectives of the Master Unit system, and with consideration for our agreement of March 30, 1961 with the Oregon State Game Commission relating to deer winter ranges, that these provisions be accorded full recognition in their relation to the wildlife resource.

WILDLIFE SPECIES

The principal wildlife species to be considered in Bureau plans for eastern Oregon are:

Big game:
- Mule deer
- Antelope

Game birds:
- Sage grouse
- Valley quail
- Mountain quail
- Chukar partridge
- Hungarian partridge
- Mourning dove

Waterfowl (various species)

Sharptail grouse (consider for reintroduction)

Game fish
- Various stream and lake species

Non-game
- Predators (Coyotes, bobcats)
- Rodents and rabbits

WILDLIFE MANAGEMENT

Management of fish and game animals is the responsibility of the State Game Commission. Close cooperation should be maintained with the Commission's field staff. They can supply technical information and details concerning fish and game; population or trend estimates, sex and age composition data and harvest estimates for most game species; and can locate game concentrations by season of use. They are in a position to cooperate with the project plan as outlined under Cooperation.

Waterfowl are protected by the Migratory Bird Treaty Act under regulations adopted by the Secretary of the Interior and administered by the Bureau of Sports Fisheries and Wildlife. States may have more restrictive regulations. Habitat developments are conducted by both agencies. State developments are often accomplished with federal aid.

The laws for the control of predatory animals - which by definition "...includes rabbits, rodents and birds which are or may be destructive to agricultural crops, products and activities, but excluding game birds and migratory water fowl" - are administered by the State Department of Agriculture. The State has a cooperative agreement with the U. S. Fish & Wildlife Service relative to carrying out the control provisions. The State Game Commission contributes to a predatory animal control fund. The Branch of Rodent and Predator Control, Bureau of Sports Fisheries & Wildlife, maintains a field staff covering most counties.

WILDLIFE HABITAT MANAGEMENT

Management of wildlife habitat is largely a responsibility of the landowner or land-administering agency. The principal wildlife needs are acceptable food, water and shelter distributed so as to be available.

The preferred habitat types for wildlife species may be the ecological climax for the area, as in the case of most forest grouse, or they may be secondary stages of succession, as in the notable examples of ground squirrels and deer. For others, such as antelope, opinion is not unanimous. Because a species inhabits a certain environment today, does not necessarily imply that it is preferred. Neither, of course, is such habitat necessarily in the best condition for that species. Winter collections of deer stomach samples containing conifer-tree needles should not be

construed as indicating palatability. Because a species gets along, in limited numbers, under scarce water availability, it should not be assumed that the water supply is adequate.

Habitat management consists, in part, of determining the best set of conditions for maintaining optimum (desired levels) wildlife populations. There are most apt to be two critical periods: 1) for the young when they are small (and the nesting season for birds, and 2) during and immediately following the most unfavorable climatic season, usually winter. Habitat management is also concerned with improving existing conditions through wildlife management measures (as hunting seasons), protection of the wildlife population and especially its habitat, and through habitat development.

Some of the principal habitat requirements of game and fish, and suggestions regarding predators and rodents, are considered below.

Upland Game Bird Habitat

Brushy cover is essential for valley quail, mountain quail and sage grouse (extensive sagebrush areas) and is utilized my most other species including chukars and the rare (in Oregon) sharptail grouse. Bunchgrass range is favored by Hungarian partridge and sharptails. Brushy draws, rimrocks, creek bottoms and similar habitat (often of low economic value) are most attractive. Chukars, sage grouse, doves and other birds concentrate near water during the dry season. Valley quail are most localized in their daily movements and need tall brush or trees such as juniper for roosting. A wide variety of fruits, seeds, green leafage and insects is utilized as food by quail, Huns, chukars, sharptails and sage grouse. Clovers and alfalfa provide excellent habitat for raising broods and for furnishing necessary succulence and green feed during the dry season. Severe winters, particularly with deep or crusted snow or ice, cause major losses to game bird populations; the least mobile, such as valley quail, are the most susceptible. Sage grouse are strong flyers and can move to more favorable surroundings. Mourning doves are migratory and leave our territory during the winter. Sage grouse and sharptails have a special requirement in that strutting or booming grounds of the birds' own choosing are necessary to their occupation of a range. Known sites should be protected. Most gallinaceous birds also require a source of grit. Usually the most beneficial habitat improvements for the upland game birds on the federal range, in carefully selected locations, are provision of: 1) available water and 2) green feed.

Reference: Upland Game Birds, Wildlife Bulletin No. 5, Oregon State Game Commission.

Waterfowl Habitat

In eastern Oregon the large concentrations of waterfowl are found at a few well-known areas. Scattered throughout the region, however, are many small sites providing habitat for a few ducks. Their principal values to waterfowl are: 1) spring nesting and raising of broods, and 2) feeding and resting areas during fall migrations. The commonest nesting species are the Canada goose and such dabbling ducks as the mallard, pintail, widgeon, gadwall, shoveller, green-wing and cinnamon teals. The favored goose nesting areas are in marshes or along the larger streams. Individual pairs will be found in pastures, haystacks and smaller marshes. The ducks mentioned will nest around shallow lakes and reservoirs, marshes and potholes, irrigation projects and even livestock water holes. A primary need is that the water level remain fairly constant through the nesting period - at least not flooding or going dry. Shallow water with submerged and emergent vegetation is preferred. The water supply should remain until the young can fly.

Migratory birds require feeding and resting areas. Aquatic and marsh vegetation needs a fairly constant water level during the growing season. Some of the best wild, waterfowl food plants in southeastern Oregon include: sedges (Carex), bulrushes (Scirpus), pondweeds (Potomogeton), smartweeds (Polygnum), and wild millet (Echinochloa). Most important waterfowl food plants are palatable to livestock and may need protection. Grain stubble, winter wheat and pastures are attractive to some species.

On Bureau lands, protection of existing habitat from drainage and overgrazing may be our greatest opportunity. Stabilizing water levels is most important. On key projects, the State Game Commission or Fish & Wildlife Service may be interested in development.

Reference: Planting Food for Waterfowl, Oregon State Game Commission.

Big Game Habitat

Mule Deer. The mule deer as a species is locally migratory. Usually this is an elevational movement correlated with seasonal weather cycles. Mule deer utilize BLM lands principally during the winter and early spring. Their winter ranges are well known and have been identified by the Game Commission. An inter-agency agreement, dated March 30, 1961, commits the Bureau to give these ranges special consideration.

Deer move out of the upper, forested areas with the first severe, fall storms. On Great Basin ranges in Oregon deer are less concentrated and seasonal migrations are limited.

A smaller variety of forage species is available on winter ranges. Utilization of shrubs increases. Dry or green grasses and weeds are taken when available. Where bitterbrush is present it is the preferred and staple item. Often bitterbrush and big sagebrush occur as a mixed stand, and on such sites both species are well utilized. Studies show, however, that deer make limited use of big sagebrush when restricted to it. Extensive stands of big sagebrush without palatable browse species intermixed with it are not preferred habitat for deer. However, sagebrush is an important emergency food on ranges where deer are concentrated during periods of severe winter weather. Low sagebrush (A. arbuscula) is considered to be more palatable. Juniper and the rabbitbrushes rate low.

A California-Oregon study of an interstate deer herd over a four-year period found the following utilization-composition relationship:

	Composition	Utilization
	Percent	
Big sagebrush	38	8
Bitterbrush	8.5	35
Juniper	1.9	-

Palatable browse includes species of: Cercocarpus, Prunus, Amelanchier, Salix, Populus, Sambucus, Eriogonum, Symphoricarpos, Eurotia, Atriplex, and, of course, others.

Green grasses and forbs are well utilized as they become available in late winter or early spring. Deer feed in grain and alfalfa fields and sometimes raid haystacks. So-called artificial feeding, however, has not proved practical.

The most common deficiencies on winter ranges are due to their depleted condition. Forage production of palatable species decreases and new plants are scarce on over-utilized ranges. Proper management of the deer and the range is by far the most important and practical approach to meeting the needs of a deer herd. Recovery of these ranges is slow, and the poorer the condition, the slower the rate of recovery. Protection of remnants of desirable browse stands, and browse-range improvement through management are fundamental needs of our deer winter ranges. These are usually also the spring-fall ranges for livestock. Because of their food habits, restricting livestock use to spring, not fall, should favor the brush on these ranges.

References: Oregon's Mule Deer, Oregon State Game Commission. Deer Management and Range Livestock Production, Cir. 121, Utah State Agricultural College, Logan

Antelope Antelope are widely scattered throughout southeastern Oregon, but much potential range remains unoccupied and further increases and better distribution are desirable. One habitat requisite is their preference for ranges permitting good visability. Some small groups occupy juniper or pine forests, generally near the edges, but low sagebrush and grass ranges having unrestricted view are typical. The low sagebrush type is the one most commonly occupied in southeastern Oregon. Big sagebrush stands are not favored. In the Rocky Mountain states herds frequent the short grass plains. Studies consistently indicate that a large part of the antelope diet consists of sagebrush. A year-long stomach analysis study of the Hart Mountain antelope herd showed sagebrush (leaves, stems, flower buds) accounted for 61% of the volume consumed and occurred in 96% of the stomachs. Artemisia cana made up 100% of the composition in several stomachs. Bitterbrush use was heavy, rabbitbrush light, during summer. Many forbs were utilized while green. Green grasses were taken readily when available during the late fall and early spring months. Dry grass and forb leafage and seeds were eaten sparingly. In an Oregon list of 65 forage plants of antelope there are 21 grasses, 2 sedges, 30 forbs, and 12 shrubs. Alfalfa, sweetclover and other legumes, and growing grain are attractive wherever available. Antelope apparently are able to live without free water, but drink the year round if it is available.

The most beneficial habitat improvements for antelope are basically the same as recommended for the upland game birds: 1) available water and 2) green feed. The vegetation, however, should be of low growth form. One caution concerning range fence construction in antelope country is to insure that they permit passage of antelope.

Reference: Oregon's Pronghorn Antelope, Oregon State Game Commission.

Predator and Rodent Control

The Branch of Predator and Rodent Control, Bureau of Sport Fisheries & Wildlife, is primarily responsible for control of predators and rodents on BLM lands. Necessary control programs

can be worked out with their personnel at the district level. The field staff of control agents is financed by federal, state and county funds. BLM range improvement funds may properly be expended for control of rodents and predatory animals. Where it is determined to be necessary to the protection of BLM lands, the services of the Bureau of Sports Fisheries & Wildlife may be requested. District personnel of the two agencies should collaborate closely. It is essential to insure that conflicts with various interests using the range are minimized. District managers should exercise any necessary regulation of the control methods used. The "Agreement for Placement of Lethal Baits for Predatory Animal Control" form (Illustration 9, Vol. IX, part 8) should be utilized in accordance with Manual instructions.

It is necessary to have a hunting license in possession to hunt or kill predatory animals. No bounties are paid by the State; however, some counties make bounty payments. Hawks, owls and eagles are protected by law.

Fisheries Habitat

The fundamental needs of fish in their aquatic environment include: proper water temperature, suitable chemical composition, suitable food available, spawning facilities, and places to hide. Both water quantity and quality requirements must be met if an adequate fishery is to be maintained. In lakes, ponds and reservoirs a balance must be maintained between food and fish. Stream management may be more complex, as it is influenced by: irrigation, mining, logging, road construction, channel changes, diversions, dams, etc.

Water quality factors include: temperature, oxygen content, freedom from pollution and turbidity. They affect both fish life and its aquatic food. Necessary cool temperatures are aided by shaded banks. Soil should be stabilized throughout the watershed to minimize erosion. Channels and banks should be protected from soil disturbances. When silt settles out over gravel bars, eggs may be buried, water flow prevented and oxygen supply reduced; aquatic insects and other fish foods may be covered. Silt, changing the character of the stream bottom, will affect the plant and insect composition upon which the fish depend, and will render the area unsuitable for future spawning. Pollution can reduce oxygen content of a body of water below the point necessary to maintain fish life.

Water quantity is the requirement for a permanently adequate stream flow, or reservoir level, to maintain fish life. Maintenance of the necessary cool temperatures is the principal factor concerned. It is important to maintain the natural, normal pattern of stream flow to which the fish have become adapted. Adequate flows are essential to the production of aquatic foods. In general, the carrying capacity of a given stream is determined by its minimum flow.

Reference: Fish Conservation Fundamentals, Sport Fishing Institute, Washington, D. C.

WILDLIFE HABITAT IMPROVEMENT - GAME

Most habitat improvements for wildlife applicable to BLM ranges are not materially different from recognized range improvement practices. Fencing, vegetative manipulations, and water developments should be planned and conducted to give consideration to special wildlife habitat requirements. Suggestions concerning these needs are discussed below.

In general, efforts to improve habitat quality and thus carrying capacity should be concentrated first on important sites known to be utilized by the species - such as principal deer winter ranges and antelope ranges; and for birds any areas around water, especially creek bottoms and springs. Later or as opportunity affords, other potential sites may be developed to aid species distribution or to extend its range.

Habitat improvement is not a substitute for management. Without management, development effort is largely wasted.

Only a small percent of the total federal range in the districts lies within the designated critical deer winter ranges, as shown below:

District	Total Federal Range (Acres)	Federal Range in Critical Deer Winter Range (Acres)	%
Lakeview	3,236,500	296,480	9
Burns	3,295,000	288,160	9
Vale	4,638,800	270,400	6
Prineville	1,000,300	90,240	9
Baker	363,200	103,520	28
Totals and Average	12,533,800	1,048,800	8.4

However, a large percentage of these ranges is under federal administration and, with one exception, private land is a much smaller percentage, as shown below;

Land Status	Lakeview	Burns	Vale	Prineville	Baker
BLM	59.9	60.4	73.8	37.6	31.1
Other federal	12.2	0.3	0.3	25.7	5.6
Other public	5.3	4.8	4.2	8.8	2.6
Private	22.6	34.5	21.7	27.9	60.7

Fencing

Fences used as exclosures to protect an area are probably the best and often the only practice needed to insure adequate habitat conditions on land or water. Fences of proper materials and design for the purpose will protect: 1) existing good habitat on selected sites from livestock, for example stream banks, reservoirs, ponds, springs and sloughs from trampling, pollution and overgrazing; 2) new developments from livestock while permitting use by wildlife, for example seeding of forage plants for wildlife; and 3) study plots and demonstrations. No gates should be provided unless essential to the development. Facilities for livestock watering, if necessary, may be provided by pipe and tank installations. If there is any recreational potential it should be considered. Exclosures around water should be large enough to permit growth of food and cover plants for small game.

Range fences should not act as a barrier to free movement of antelope. The Manual (IX 8.5.3) states that our fencing program will definitely consider wildlife. The Director's policy statement of May 15, 1959 includes the following excerpts: "... fencing practices which may adversely affect or endanger wildlife would not be in keeping with the multiple-use principles of land management and must be avoided. ...it should be a standard practice to publicly announce plans for Bureau fencing programs, and...where big game or other wildlife species may be affected by such activities, prior consultation should be had with State Game Department officials..." If agreement on the program cannot be reached, the matter will be referred to the State Director.

The U. S. Fish & Wildlife Service, upon request from the Interstate Antelope Conference of 1962, has issued recommendations for barbed wire fences on range lands. For three-wire livestock fences (our usual practice) they recommend spacings of 18, 10 and 12 inches, measured from the ground upward, for a total height of

40 inches. Four-wire fence spacings recommended are 16, 6, 8 and 10 inches, from the ground upward, also resulting in a total height of 40 inches. The U. S. Fish & Wildlife Service issued recommendations concerning sheep-tight fences on antelope range in a report of C. H. Rouse dated January 29, 1954. When woven wire is required, a height of 26 inches is recommended, with not more than two strands of barbed wire on top, one strand not more than 4 inches above the woven wire and the top strand 12 inches above the lower one. No barbed wire should be placed below the woven wire. The use of 5-strand, barbed-wire fences for sheep, with spacings of 5, 11, 18, 26 and 38 inches high is recommended. Fences may influence antelope movements due to the animals' tendency to drift with a fence rather than cross it.

Information from Wyoming states that a 4-wire fence with posts six feet apart and wires taut should keep antelope out of pastures, while fences with posts 16 feet apart let antelope pass through. Permits on BLM lands in Wyoming limit fences to 5 wires and 16 foot post spacing.

Vegetation

Manipulation of vegetation to produce the best combination of quality and quantity of forage and/or cover plants for the species to be benefitted is the goal. This may be done solely in consideration of wildlife, usually by seeding forage or cover plants, or it may be a multi-purpose project which includes wildlife benefits.

Brush Control

Wildlife species require suitable vegetative composition for protection and food. Brush is considered to be one of the most desirable forms of vegetation for many wildlife species. However, extensive solid stands of big sagebrush is not a preferred habitat type, for either mule deer or antelope, although it is an important emergency food. Some other sagebrush species are considered to be more desirable. Sagebrush is an important type for sage grouse. Antelope utilize gray and green rabbitbrush as food, but percentage totals are low. Bitterbrush is a preferred food of both deer and antelope. Mixed stands of big sagebrush-bitterbrush are usually well utilized and are an important type on deer winter ranges. For these reasons, sagebrush spraying or other means of brush control should be confined to extensive, solid stands of big sagebrush or rabbitbrush or combinations of these where valuable species such as bitterbrush are absent and where no important game species are endangered. Treatment should be withheld, at this time, from any

and all mixed stands containing an appreciable percentage of bitterbrush, even though progress has been made in selective control. The important, designated big game ranges should not be treated at present. In accordance with our agreement with the Game Commission we will: "advise the Commission, through its local representative, of any plan to sell, exchange, burn, spray, cultivate, reseed, or otherwise alter the status or character of BLM lands within the described big game winter ranges before executing such programs".

If some portion of the designated ranges is a key factor in a proposed range rehabilitation project, the matter should be discussed with the local game agent and, preferably, a written opinion received from the Game Commission Supervisor for the region. On-site inspection by all interested parties and thorough discussion of plans is desirable in these instances. If agreement cannot be reached the matter will be referred to the State Director. Areas known to be particularly favored by sizeable populations of sage grouse should be given special consideration. The principal strutting grounds of these birds should be preserved. Careless or unnecessary spraying of rough areas, creek bottoms and similar sites valuable to wildlife should not be permitted. Care also should be taken when spraying rough or rimrock ranges to avoid drifting spray onto areas under rims, sites supporting valuable browse species, or areas inaccessible to livestock. The U. S. Public Health Service is concerned whenever chemical sprays reach live streams. So-called controlled burning is destructive to wildlife habitat and wildlife interests should be represented in any such planning. Every effort should be exerted to control wild fires on important game ranges with a minimum loss or sacrifice of acreage.

Range Seeding

Grasses and forbs. Wildlife species make varying degrees of use of grass either for cover or food or both. Grass does not normally comprise a large percentage of the diet of either deer or antelope. However, during the late winter and spring they do concentrate on new green growth. Much evidence indicates that in the plains states antelope feed (or fed) largely on grass. Perhaps they would eat more grass in the Great Basin region if more of it were available. There may be a significant correlation in the reversion of bunchgrass ranges to sagebrush, and the decline in antelope populations. Antelope, and deer seasonally, utilize seedings of grass, alfalfa, clovers, and green grain where available. Seedings scattered throughout their range should improve the habitat for antelope, deer and various species of upland game birds.

Legume fields, especially, are attractive nesting and brood-rearing habitat due to their excellent cover, succulent forage and abundance of insects.

Grass-legume mixtures or legumes alone should be seeded primarily for wildlife on selected sites and fenced to exclude livestock. Avoid sheep allotments unless proper control is assured. Many perennial forbs would provide choice forage and could be seeded if their growth requirements were better known and seed were available. Nomad alfalfa appears to be one of the best candidates for this purpose within its range of adaptability.

Browse valuable for forage may be seeded on big game winter ranges. Selection of adapted species, seed collection, site selection, planting techniques, and management methods all present problems, although the subject of much research and other attention in recent years. Sufficient information is available to plant certain sites with certain species, particularly bitterbrush, with hope of modest success. Fourwing saltbush is under trial for some sites not adapted to bitterbrush. Early efforts should be restricted to study plots or demonstration scale plantings.

Water Developments

Most wildlife species drink water when it is available. Some species, especially when young, require it. Water contributes to better distribution of game animals and utilization of the range, just as in livestock management. Small game, particularly young birds, are more abundant around water.

Livestock-type waterholes and developed springs and seeps are excellent wildlife habitat improvements. Cooperation of the Game Commission could be sought in locating and developing such units primarily for wildlife.

Where these more general type practices are not possible or practicable for upland game birds, and water development is desired, a cistern may be installed. With cooperation from the Game Commission, self-filling units designed for this purpose could be made available. The Game Commission has also cooperated in installation of devices at stock tanks which make water available to birds. All open tanks and troughs should be provided with ramps to enable birds and small mammals to utilize the water without drowning.

Some ranges that may be unavailable to livestock due to lack of water can be utilized, at least seasonally, by big game. Before developing water on such areas, if these are critical ranges, consider the possible adverse effect on wildlife.

The average optimum distances which should separate available water sources for various game species depends upon a number of local factors and no definite figures are widely applicable. Some years ago, western game departments were polled on this subject and the consensus of replies was shown below (partial list)

Valley quail	1/2 to 1 mile
Sage grouse	2 to 2-1/2 miles
Deer	4 to 5 miles
Antelope	5 to 10 miles

WILDLIFE HABITAT IMPROVEMENT - FISH

This is more a matter of restoration of the original, natural state, now so largely despoiled by man, than it is to improve on nature.

The fundamental goal is maintenance of a stable and adequate quantity of water of good quality. Clean water with a chemical composition and temperature suitable for the desired fish life and its food species is necessary. In addition the stream bottom must provide facilities for spawning and hiding.

Siltation and pollution are our major destroyers of fish habitat. Stream management is dependent upon watershed conditions. Protection of watersheds through proper land use is the basic remedy. Proper use involves erosion control by maintaining adequate vegetative cover on the land. Many activities of man contribute to the decline of fish habitat. A few of the most important ones affecting our streams and impoundments are discussed below.

Streams

Road construction. Damages are usually due to siltation, disturbance of gravel beds, straightening channels, jams of logs and debris, and blocking passage at culverts. Recommendations follow:

1) Keep roadways as far as possible from creek channels. Locate on benches or ridges away from streams. Avoid changing or straightening stream channels.

2) Plan grades and drainage so that runoff does not enter streams directly. Avoid excessive grades.

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2) Keep streams free of logging debris.

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> ...no officer or agency of the state, or officer or agency of any political subdivision within the state shall issue a permit or license for any program which contemplates the removal of any sand, gravel, rock, silt or other material from the beds or banks of any stream, lake or other body of water which may be utilized or made available to food or game fish to any person, firm, corporation or government body without first notifying, in writing, the State Game Commission and the Fish Commission of Oregon.

Hydraulic mining may produce excessive turbidity and silting of streams. Settling ponds may sometimes be practicable. Dredge mining has caused major destruction to streams. By leaving the land upside down, not only the streams but sizeable surrounding areas have become unproductive. Oregon law (ORS 517.611) provides safeguards against destructive and harmful practices of placer and hydraulic mining. A side-effect of mining explorations and activity is the accelerated erosion resulting from low-standard roads. Stream pollution from mine-wastes and processing results from some types of operation.

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Oregon law also requires tha anyone constructing a dam or other artificial obstruction across any stream frequented by game fish, or using such an obstruction previously built, shall provide passageway for fish over such obstruction. Examination and approval of all such fishways rests with the Game Commission. (ORS 498.730)

Human occupancy. Both recreational areas and permanent residential and industrial installations may be major sources of stream siltation and pollution. Adequate sanitary facilities at some distance from the water should be provided at camp and picnic grounds. Fire prevention safeguards are, of course, necessary. Inadequate waste treatment at industrial plants results in stream pollution. Soil conservation programs aid materially in reducing the amount of soil washed into streams.

Stream improvement structures sometimes installed under well-intentioned habitat development programs must be carefully planned and constructed lest they do more harm than good.

Proper stream management is largely a matter of watershed use. Where man has not tampered with the watersheds, habitat improvement is usually not needed.

Pesticides. Some commonly used pesticides are toxic to fish and aquatic organisms even when present in very minute concentrations. When applications are necessary, suitable compounds and formulations least toxic to these aquatic life forms should be selected. Care in application can further minimize needless losses.

Reference: Pesticides: Their Use and Toxicity in Relation to Wildlife, Game Bull. No. 7, California Dept of Fish and Game.

The Director's Instruction Memo RM-25 (Expired 12/62) advised that regardless of the chemicals used, the Fish & Wildlife Service should be consulted whenever an insect control study is undertaken. It is also recommended that the State Game Department be invited to cooperate. It asked that the Director be apprised of any research work that may be contemplated. Also, all formal, cooperative research agreements or memorandums of understanding should be submitted for review before they are consummated.

Impoundments

Many of the comments regarding siltation and pollution of streams are applicable to lakes and reservoirs. The situation here is usually less complex. Pollutants and silt loads may reach high concentrations in impounded waters as inlet deposits accumulate. Turbidity and sediment obstructing light penetration reduce or eliminate plant growth. Reservoirs tend to become shallower and water temperatures rise. The habitat becomes unsuitable for the most desired fish species. Fluctuating water levels due to heavy run-off periods alternating with drawdowns or seepage and evaporation losses may be problems which can be alleviated. All fish species have certain special requirements for spawning; in some cases the unsuitability of inlet streams may be the determining factor. Heavy growths of aquatic weeds may adversely affect the biological balance of the area as well as impede the fishing. Warm water reservoirs are particularly vulnerable to so-called trash-fish infestations resulting usually from unwise introductions. Eventually this results in practically eliminating the desired species. The remedy is a costly chemical treatment. It is particularly important in impoundments to maintain a balance between food and fish. Siltation and pollution are as destructive to aquatic fish-food organisms as to the fish themselves. To repeat: protection of watersheds by proper land use is the basic requirement for maintaining fish habitat.

STUDIES

Research

The BLM is authorized to cooperate in certain studies, such as wildlife investigations initiated by a state agency. Special wildlife problems needing research may be referred to the Bureau of Sports Fisheries & Wildlife upon approval of the Director. (IX 8.2.3)

Studies of wildlife species probably are best conducted by wildlife agencies. The Bureau, however, can actively cooperate in such projects by providing land, giving technical assistance, and aid in their establishment and maintenance.

Studies of wildlife habitat can be undertaken cooperatively in accordance with existing or special agreements. Often both the wildlife and its habitat are phases of a single project. The

Manual strongly recommends cooperative studies of game ranges with interested land-administering agencies. (IX 10.3.36) Cooperative studies may insure better acceptance of results.

Evaluation

A two-part, systematic appraisal of each wildlife habitat development should be made at appropriate times with regard to its success.

First, the success of the development itself should be determined; i.e., the establishment of a seeding, the brush control achieved on a sprayed site; the filling and water retention of a waterhole, etc. In addition, utilization by wildlife as intended should be determined by spot checking and recording of incidental observations.

The value of a project is difficult to determine. Evidence of substantial wildlife use should be documented.

The State Game Commission is interested in evaluating our range rehabilitation practices and projects from the standpoint of their effect upon wildlife. They have recently accepted our invitation to conduct such evaluations and are undertaking a long-range study. Our sincere cooperation should be given this mutually beneficial effort.

get more details Vale.

APPENDIX

1. Cooperative Agreement with Oregon State Game Commission (general) dated March 20, 1961.

2. Cooperative Agreement with Oregon State Game Commission Relating to Big Game Winter Ranges, dated March 30, 1961.

COOPERATIVE AGREEMENT

Oregon State Game Commission - U. S. Bureau of Land Management

This Memorandum of Understanding, made in duplicate this 20th day of March, 1961 by and between the Oregon State Game Commission, hereinafter called the "Commission" and the United States Bureau of Land Management, State Office, hereinafter called the "BIM" WITNESSETH:

WHEREAS the Bureau is authorized under sections 2 and 9 of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269) to enter into cooperative agreements with official State agencies to carry out the purpose of this Act and the Commission is similarly authroized under the laws of the State of Oregon to enter into cooperative agreements; and

WHEREAS the Commission has been created by the laws of the State of Oregon to protect and manage the fish and wildlife resources of the State of Oregon.

WHEREAS the BIM is responsible for the protection and management of a part of the public lands in the State of Oregon.

WHEREAS it is the mutual desire of the Commission and the BIM to work in harmony for the common purpose of developing, maintaining, and managing all of the natural resources in the best interests of the people of Oregon and of the United States.

THE BIM AGREES:

(a) To assist officers of the State with the enforcement of Oregon game and fish laws.

(b) To make available to representatives of the Commission such BIM improvements, facilities, and equipment as would normally be used in wildlife work, provided that they are not being currently utilized by the BIM.

(c) To furnish the Commission with copies of reports prepared by the BIM.

(d) To permit the erection and maintenance of structures needed to facilitate wildlife management activities of the Commission upon public lands administered by the BIM provided such structures conform in character and location with the usual requirements of BIM, and their intended use is not in conflict with BIM policy.

(e) To practice those forms of land and resource management that will benefit fish and wildlife, consistent with a sound multiple use program.

(f) To recognize the Commission as the agency responsible for management of the fur, fish, and game resources of the State of Oregon.

THE COMMISSION AGREES:

(1) To permit the use of such facilities, equipment and personnel as can be devoted for the suppression of fires on or near BLM lands insofar as is consistent with state laws and regulations and provided they are not being currently utilized by the Commission.

(2) To submit plans for the introduction of exotic species on BLM lands for study and recommendations by the BLM before activating such a program.

(3) To make no use of poisons for the control of predatory animals or other wildlife on the BLM lands without approval of the BLM.

(4) To notify the BLM of changes in regulations or management plans that may influence BLM programs.

(5) To erect no permanent signs or structures and perform no construction or other acts not herein provided for without first securing the concurrence of the State Supervisor.

(6) To provide the BLM with copies of game and fish reports pertinent to management of wildlife on BLM lands.

(7) To recognize the BLM as the agency responsible for the development and management of the certain federal public domain lands of Oregon.

(8) To make pertinent information on game populations and game use available to the BLM and to assist the BLM in making reservation of forage for game animals on BLM lands.

THE COMMISSION AND BLM MUTUALLY AGREE:

(a) To cooperate in the restoration, harvesting, and general management of wildlife resources of the State of Oregon consistent with the multiple land use program.

(b) To promote a united approach by all interested parties to the problems relating to wildlife and fisheries management.

(c) To cooperate in the formulation and application of practical plans and programs for the management of wildlife and habitat upon BLM lands.

(d) To meet jointly at least once annually, and more often if necessary, for discussion of matters relating to the management of wildlife resources in or affecting the BLM lands and to provide for other necessary meetings at various administrative levels for discussions of law enforcement; grazing; educational programs; cooperative studies; plans; wildlife surveys; hunting, fishing and trapping seasons; and such other matters as may be relevant to the wildlife resource and its habitat.

(e) That all questions pertaining to the cooperative work of the two agencies which arise in the field will be discussed on the ground by the local representatives of the Commission and the BLM, and that questions of disagreement will be referred to the State Supervisor and to the Director of the Game Department for decision.

(f) That members of both agencies will refrain insofar as possible from expressing in public a view contrary to the accepted policy and plans of the other agency.

(g) To promote a free exchange of information pertinent to the management of wildlife or BLM resources between the personnel of the two departments.

(h) That whenever a specific area of BLM land is designated for a program of intensive cooperative management, separate and individual agreements will be entered into by the parties hereto covering the management of each such public domain or portion thereof.

(i) That each and every provision of this cooperative agreement is subject to the laws of the State of Oregon and the laws of the United States.

(j) That nothing in this agreement shall be construed as obligating either the Commission or BLM in the expenditure of funds, or for future payment of money in excess of appropriations authorized by law.

(k) That nothing herein contained shall be construed as limiting or affecting in any way the delegated authority of the Commission or the BLM.

(l) That this agreement shall become effective as soon as it is signed by the parties hereto and shall continue in force until termination by either party upon thirty (30) days' notice in writing to the other of its intention to terminate upon a date indicated.

(m) That no Member of, or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made for a corporation for its general benefit.

(n) That amendments to this Cooperative Agreement may be proposed by either party and shall become effective upon approval by both parties.

OREGON STATE GAME COMMISSION

By /s/ P. W. Schneider
Director

UNITED STATES BUREAU OF LAND MANAGEMENT

By /s/ Russell E. Getty
State Supervisor

COOPERATIVE AGREEMENT

U. S. Bureau of Land Management - Oregon State Game Commission

Relating to Big Game Winter Ranges

This Memorandum of Understanding, made in duplicate this 30th day of March, 1961 by and between the Oregon State Game Commission, hereinafter called the "Commission" and the United States Bureau of Land Management, hereinafter called the "BLM" WITNESSETH:

WHEREAS the BLM and Commission on March 20, 1961 agreed to cooperate in the development and maintenance of wildlife resources and habitat upon BLM lands and stated authority for such agreement of purpose, and

WHEREAS winter range and forage is a principal limiting factor of deer and elk production in the State of Oregon, and

WHEREAS certain BLM lands constitute an important part of critical big game winter ranges and contribute to the maintenance of big game populations, and

WHEREAS the management applied on these BLM lands influences their utility and contribution to maintenance of big game populations, and

WHEREAS it is the mutual desire of the BLM and the Commission to develop and manage said lands in a manner that will produce maximum economic and recreational benefits for the people of Oregon and the United States,

THE COMMISSION AGREES:

1. To define the boundaries of important big game winter ranges.

2. To provide the BLM with its measures of game use, forage trends, and other data pertinent to the development and management of the described lands.

3. To periodically revise boundaries of winter ranges and data pertinent to their management.

4. To promptly assist the BLM in determining the probable effects of potential development, management, or disposal programs upon big game resources.

THE BIM AGREES:

1. To advise the Commission, through its local representative, of any plan to sell, exchange, burn, spray, cultivate, reseed, or otherwise alter the status or character of BIM lands within the described big game winter ranges before executing such programs.

2. To thoroughly consider all values relating to maintenance of game resources and recreation in designing land development and management programs affecting the described winter ranges.

THE COMMISSION AND BIM MUTUALLY AGREE:

1. That each and every provision of this cooperative agreement is subject to the laws of the State of Oregon and the laws of the United States.

2. That nothing in this agreement shall be construed as obligating either the Commission or BIM in the expenditure of funds, or for future payment of money in excess of appropriations authorized by law.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Land Management
State Office
710 N.E. Holladay
Portland, Oregon 97232

4300(100.6)

February 14, 1964

State Director
Bureau of Land Management
Reno, Nevada

Enclosed is a copy of a new State Office release titled "Guidelines for Wildlife Habitat Improvements in Oregon Grazing Districts" which we thought might be of interest to you.

Very truly yours,

E. H. Rudd
Acting State Director

Attachment

Routing	Initial	Date	Copy
SD			
AO			
RUS			
L&M			
R&F		2/25	
ENG			
ACTION			
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40 inches. Four-wire fence spacings recommended are 16, 6, 8 and 10 inches, from the ground upward, also resulting in a total height of 40 inches. The U. S. Fish & Wildlife Service issued recommendations concerning sheep-tight fences on antelope range in a report of C. H. Rouse dated January 29, 1954. When woven wire is required, a height of 26 inches is recommended, with not more than two strands of barbed wire on top, one strand not more than 4 inches above the woven wire and the top strand 12 inches above the lower one. No barbed wire should be placed below the woven wire. The use of 5-strand, barbed-wire fences for sheep, with spacings of 5, 11, 18, 26 and 38 inches high is recommended. Fences may influence antelope movements due to the animals' tendency to drift with a fence rather than cross it.

Information from Wyoming states that a 4-wire fence with posts six feet apart and wires taut should keep antelope out of pastures, while fences with posts 16 feet apart let antelope pass through. Permits on BLM lands in Wyoming limit fences to 5 wires and 16 foot post spacing.

Vegetation

Manipulation of vegetation to produce the best combination of quality and quantity of forage and/or cover plants for the species to be benefitted is the goal. This may be done solely in consideration of wildlife, usually by seeding forage or cover plants, or it may be a multi-purpose project which includes wildlife benefits.

Brush Control

Wildlife species require suitable vegetative composition for protection and food. Brush is considered to be one of the most desirable forms of vegetation for many wildlife species. However, extensive solid stands of big sagebrush is not a preferred habitat type, for either mule deer or antelope, although it is an important emergency food. Some other sagebrush species are considered to be more desirable. Sagebrush is an important type for sage grouse. Antelope utilize gray and green rabbitbrush as food, but percentage totals are low. Bitterbrush is a preferred food of both deer and antelope. Mixed stands of big sagebrush-bitterbrush are usually well utilized and are an important type on deer winter ranges. For these reasons, sagebrush spraying or other means of brush control should be confined to extensive, solid stands of big sagebrush or rabbitbrush or combinations of these where valuable species such as bitterbrush are absent and where no important game species are endangered. Treatment should be withheld, at this time, from any

and all mixed stands containing an appreciable percentage of bitterbrush, even though progress has been made in selective control. The important, designated big game ranges should not be treated at present. In accordance with our agreement with the Game Commission we will: "advise the Commission, through its local representative, of any plan to sell, exchange, burn, spray, cultivate, reseed, or otherwise alter the status or character of BLM lands within the described big game winter ranges before executing such programs".

If some portion of the designated ranges is a key factor in a proposed range rehabilitation project, the matter should be discussed with the local game agent and, preferably, a written opinion received from the Game Commission Supervisor for the region. On-site inspection by all interested parties and thorough discussion of plans is desirable in these instances. If agreement cannot be reached the matter will be referred to the State Director. Areas known to be particularly favored by sizeable populations of sage grouse should be given special consideration. The principal strutting grounds of these birds should be preserved. Careless or unnecessary spraying of rough areas, creek bottoms and similar sites valuable to wildlife should not be permitted. Care also should be taken when spraying rough or rimrock ranges to avoid drifting spray onto areas under rims, sites supporting valuable browse species, or areas inaccessible to livestock. The U. S. Public Health Service is concerned whenever chemical sprays reach live streams. So-called controlled burning is destructive to wildlife habitat and wildlife interests should be represented in any such planning. Every effort should be exerted to control wild fires on important game ranges with a minimum loss or sacrifice of acreage.

— so often!

Range Seeding

Grasses and forbs. Wildlife species make varying degrees of use of grass either for cover or food or both. Grass does not normally comprise a large percentage of the diet of either deer or antelope. However, during the late winter and spring they do concentrate on new green growth. Much evidence indicates that in the plains states antelope feed (or fed) largely on grass. Perhaps they would eat more grass in the Great Basin region if more of it were available. There may be a significant correlation in the reversion of bunchgrass ranges to sagebrush, and the decline in antelope populations. Antelope, and deer seasonally, utilize seedings of grass, alfalfa, clovers, and green grain where available. Seedings scattered throughout their range should improve the habitat for antelope, deer and various species of upland game birds.

Legume fields, especially, are attractive nesting and brood-rearing habitat due to their excellent cover, succulent forage and abundance of insects.

Grass-legume mixtures or legumes alone should be seeded primarily for wildlife on selected sites and fenced to exclude livestock. Avoid sheep allotments unless proper control is assured. Many perennial forbs would provide choice forage and could be seeded if their growth requirements were better known and seed were available. Nomad alfalfa appears to be one of the best candidates for this purpose within its range of adaptability.

Browse valuable for forage may be seeded on big game winter ranges. Selection of adapted species, seed collection, site selection, planting techniques, and management methods all present problems, although the subject of much research and other attention in recent years. Sufficient information is available to plant certain sites with certain species, particularly bitterbrush, with hope of modest success. Fourwing saltbush is under trial for some sites not adapted to bitterbrush. Early efforts should be restricted to study plots or demonstration scale plantings.

Water Developments

Most wildlife species drink water when it is available. Some species, especially when young, require it. Water contributes to better distribution of game animals and utilization of the range, just as in livestock management. Small game, particularly young birds, are more abundant around water.

Livestock-type waterholes and developed springs and seeps are excellent wildlife habitat improvements. Cooperation of the Game Commission could be sought in locating and developing such units primarily for wildlife.

Where these more general type practices are not possible or practicable for upland game birds, and water development is desired, a cistern may be installed. With cooperation from the Game Commission, self-filling units designed for this purpose could be made available. The Game Commission has also cooperated in installation of devices at stock tanks which make water available to birds. All open tanks and troughs should be provided with ramps to enable birds and small mammals to utilize the water without drowning.

Some ranges that may be unavailable to livestock due to lack of water can be utilized, at least seasonally, by big game. Before developing water on such areas, if these are critical ranges, consider the possible adverse effect on wildlife.

The average optimum distances which should separate available water sources for various game species depends upon a number of local factors and no definite figures are widely applicable. Some years ago, western game departments were polled on this subject and the consensus of replies was shown below (partial list)

Valley quail	1/2 to 1 mile
Sage grouse	2 to 2-1/2 miles
Deer	4 to 5 miles
Antelope	5 to 10 miles

WILDLIFE HABITAT IMPROVEMENT - FISH

This is more a matter of restoration of the original, natural state, now so largely despoiled by man, than it is to improve on nature.

The fundamental goal is maintenance of a stable and adequate quantity of water of good quality. Clean water with a chemical composition and temperature suitable for the desired fish life and its food species is necessary. In addition the stream bottom must provide facilities for spawning and hiding.

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Reclamation. Diversion of water from streams and obstruction of channels are two types of activity not generally beneficial to stream fishes. Diversion, as for irrigation, reduces stream flow at a season when high temperatures may be harmful to fish life. Excessive diversion may reduce the quantity of water to a point where normal aquatic life ceases. Unscreened, artificial outlets are a direct source of fish loss. ORS 498.705 grants the Game Commission powers to install and maintain screening devices or cause the same to be established and maintained.

Oregon law also requires tha anyone constructing a dam or other artificial obstruction across any stream frequented by game fish, or using such an obstruction previously built, shall provide passageway for fish over such obstruction. Examination and approval of all such fishways rests with the Game Commission. (ORS 498.730)

Human occupancy. Both recreational areas and permanent residential and industrial installations may be major sources of stream siltation and pollution. Adequate sanitary facilities at some distance from the water should be provided at camp and picnic grounds. Fire prevention safeguards are, of course, necessary. Inadequate waste treatment at industrial plants results in stream pollution. Soil conservation programs aid materially in reducing the amount of soil washed into streams.

Stream improvement structures sometimes installed under well-intentioned habitat development programs must be carefully planned and constructed lest they do more harm than good.

Proper stream management is largely a matter of watershed use. Where man has not tampered with the watersheds, habitat improvement is usually not needed.

Pesticides. Some commonly used pesticides are toxic to fish and aquatic organisms even when present in very minute concentrations. When applications are necessary, suitable compounds and formulations least toxic to these aquatic life forms should be selected. Care in application can further minimize needless losses.

Reference: Pesticides: Their Use and Toxicity in Relation to Wildlife, Game Bull. No. 7, California Dept of Fish and Game.

The Director's Instruction Memo RM-25 (Expired 12/62) advised that regardless of the chemicals used, the Fish & Wildlife Service should be consulted whenever an insect control study is undertaken. It is also recommended that the State Game Department be invited to cooperate. It asked that the Director be apprised of any research work that may be contemplated. Also, all formal, cooperative research agreements or memorandums of understanding should be submitted for review before they are consummated.

Impoundments

Many of the comments regarding siltation and pollution of streams are applicable to lakes and reservoirs. The situation here is usually less complex. Pollutants and silt loads may reach high concentrations in impounded waters as inlet deposits accumulate. Turbidity and sediment obstructing light penetration reduce or eliminate plant growth. Reservoirs tend to become shallower and water temperatures rise. The habitat becomes unsuitable for the most desired fish species. Fluctuating water levels due to heavy run-off periods alternating with drawdowns or seepage and evaporation losses may be problems which can be alleviated. All fish species have certain special requirements for spawning; in some cases the unsuitability of inlet streams may be the determining factor. Heavy growths of aquatic weeds may adversely affect the biological balance of the area as well as impede the fishing. Warm water reservoirs are particularly vulnerable to so-called trash-fish infestations resulting usually from unwise introductions. Eventually this results in practically eliminating the desired species. The remedy is a costly chemical treatment. It is particularly important in impoundments to maintain a balance between food and fish. Siltation and pollution are as destructive to aquatic fish-food organisms as to the fish themselves. To repeat: protection of watersheds by proper land use is the basic requirement for maintaining fish habitat.

STUDIES

Research

The BLM is authorized to cooperate in certain studies, such as wildlife investigations initiated by a state agency. Special wildlife problems needing research may be referred to the Bureau of Sports Fisheries & Wildlife upon approval of the Director. (IX 8.2.3)

Studies of wildlife species probably are best conducted by wildlife agencies. The Bureau, however, can actively cooperate in such projects by providing land, giving technical assistance, and aid in their establishment and maintenance.

Studies of wildlife habitat can be undertaken cooperatively in accordance with existing or special agreements. Often both the wildlife and its habitat are phases of a single project. The

Manual strongly recommends cooperative studies of game ranges with interested land-administering agencies. (IX 10.3.36) Cooperative studies may insure better acceptance of results.

Evaluation

A two-part, systematic appraisal of each wildlife habitat development should be made at appropriate times with regard to its success.

First, the success of the development itself should be determined; i.e., the establishment of a seeding, the brush control achieved on a sprayed site; the filling and water retention of a waterhole, etc. In addition, utilization by wildlife as intended should be determined by spot checking and recording of incidental observations.

The value of a project is difficult to determine. Evidence of substantial wildlife use should be documented.

The State Game Commission is interested in evaluating our range rehabilitation practices and projects from the standpoint of their effect upon wildlife. They have recently accepted our invitation to conduct such evaluations and are undertaking a long-range study. Our sincere cooperation should be given this mutually beneficial effort.

get more details Vale.

APPENDIX

1. Cooperative Agreement with Oregon State Game Commission (general) dated March 20, 1961.

2. Cooperative Agreement with Oregon State Game Commission Relating to Big Game Winter Ranges, dated March 30, 1961.

COOPERATIVE AGREEMENT

Oregon State Game Commission - U. S. Bureau of Land Management

This Memorandum of Understanding, made in duplicate this 20th day of March, 1961 by and between the Oregon State Game Commission, hereinafter called the "Commission" and the United States Bureau of Land Management, State Office, hereinafter called the "BLM" WITNESSETH:

WHEREAS the Bureau is authorized under sections 2 and 9 of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269) to enter into cooperative agreements with official State agencies to carry out the purpose of this Act and the Commission is similarly authroized under the laws of the State of Oregon to enter into cooperative agreements; and

WHEREAS the Commission has been created by the laws of the State of Oregon to protect and manage the fish and wildlife resources of the State of Oregon.

WHEREAS the BLM is responsible for the protection and management of a part of the public lands in the State of Oregon.

WHEREAS it is the mutual desire of the Commission and the BLM to work in harmony for the common purpose of developing, maintaining, and managing all of the natural resources in the best interests of the people of Oregon and of the United States.

THE BLM AGREES:

(a) To assist officers of the State with the enforcement of Oregon game and fish laws.

(b) To make available to representatives of the Commission such BLM improvements, facilities, and equipment as would normally be used in wildlife work, provided that they are not being currently utilized by the BLM.

(c) To furnish the Commission with copies of reports prepared by the BLM.

(d) To permit the erection and maintenance of structures needed to facilitate wildlife management activities of the Commission upon public lands administered by the BLM provided such structures conform in character and location with the usual requirements of BLM, and their intended use is not in conflict with BLM policy.

(e) To practice those forms of land and resource management that will benefit fish and wildlife, consistent with a sound multiple use program.

(f) To recognize the Commission as the agency responsible for management of the fur, fish, and game resources of the State of Oregon.

THE COMMISSION AGREES:

(1) To permit the use of such facilities, equipment and personnel as can be devoted for the suppression of fires on or near BLM lands insofar as is consistent with state laws and regulations and provided they are not being currently utilized by the Commission.

(2) To submit plans for the introduction of exotic species on BLM lands for study and recommendations by the BLM before activating such a program.

(3) To make no use of poisons for the control of predatory animals or other wildlife on the BLM lands without approval of the BLM.

(4) To notify the BLM of changes in regulations or management plans that may influence BLM programs.

(5) To erect no permanent signs or structures and perform no construction or other acts not herein provided for without first securing the concurrence of the State Supervisor.

(6) To provide the BLM with copies of game and fish reports pertinent to management of wildlife on BLM lands.

(7) To recognize the BLM as the agency responsible for the development and management of the certain federal public domain lands of Oregon.

(8) To make pertinent information on game populations and game use available to the BLM and to assist the BLM in making reservation of forage for game animals on BLM lands.

THE COMMISSION AND BLM MUTUALLY AGREE:

(a) To cooperate in the restoration, harvesting, and general management of wildlife resources of the State of Oregon consistent with the multiple land use program.

(b) To promote a united approach by all interested parties to the problems relating to wildlife and fisheries management.

(c) To cooperate in the formulation and application of practical plans and programs for the management of wildlife and habitat upon BLM lands.

(d) To meet jointly at least once annually, and more often if necessary, for discussion of matters relating to the management of wildlife resources in or affecting the BLM lands and to provide for other necessary meetings at various administrative levels for discussions of law enforcement; grazing; educational programs; cooperative studies; plans; wildlife surveys; hunting, fishing and trapping seasons; and such other matters as may be relevant to the wildlife resource and its habitat.

(e) That all questions pertaining to the cooperative work of the two agencies which arise in the field will be discussed on the ground by the local representatives of the Commission and the BLM, and that questions of disagreement will be referred to the State Supervisor and to the Director of the Game Department for decision.

(f) That members of both agencies will refrain insofar as possible from expressing in public a view contrary to the accepted policy and plans of the other agency.

(g) To promote a free exchange of information pertinent to the management of wildlife or BLM resources between the personnel of the two departments.

(h) That whenever a specific area of BLM land is designated for a program of intensive cooperative management, separate and individual agreements will be entered into by the parties hereto covering the management of each such public domain or portion thereof.

(i) That each and every provision of this cooperative agreement is subject to the laws of the State of Oregon and the laws of the United States.

(j) That nothing in this agreement shall be construed as obligating either the Commission or BLM in the expenditure of funds, or for future payment of money in excess of appropriations authorized by law.

(k) That nothing herein contained shall be construed as limiting or affecting in any way the delegated authority of the Commission or the BLM.

(l) That this agreement shall become effective as soon as it is signed by the parties hereto and shall continue in force until termination by either party upon thirty (30) days' notice in writing to the other of its intention to terminate upon a date indicated.

(m) That no Member of, or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made for a corporation for its general benefit.

(n) That amendments to this Cooperative Agreement may be proposed by either party and shall become effective upon approval by both parties.

OREGON STATE GAME COMMISSION

By /s/ P. W. Schneider
Director

UNITED STATES BUREAU OF LAND MANAGEMENT

By /s/ Russell E. Getty
State Supervisor

COOPERATIVE AGREEMENT

U. S. Bureau of Land Management - Oregon State Game Commission

Relating to Big Game Winter Ranges

This Memorandum of Understanding, made in duplicate this 30th day of March, 1961 by and between the Oregon State Game Commission, hereinafter called the "Commission" and the United States Bureau of Land Management, hereinafter called the "BLM" WITNESSETH:

WHEREAS the BLM and Commission on March 20, 1961 agreed to cooperate in the development and maintenance of wildlife resources and habitat upon BLM lands and stated authority for such agreement of purpose, and

WHEREAS winter range and forage is a principal limiting factor of deer and elk production in the State of Oregon, and

WHEREAS certain BLM lands constitute an important part of critical big game winter ranges and contribute to the maintenance of big game populations, and

WHEREAS the management applied on these BLM lands influences their utility and contribution to maintenance of big game populations, and

WHEREAS it is the mutual desire of the BLM and the Commission to develop and manage said lands in a manner that will produce maximum economic and recreational benefits for the people of Oregon and the United States,

THE COMMISSION AGREES:

1. To define the boundaries of important big game winter ranges.

2. To provide the BLM with its measures of game use, forage trends, and other data pertinent to the development and management of the described lands.

3. To periodically revise boundaries of winter ranges and data pertinent to their management.

4. To promptly assist the BLM in determining the probable effects of potential development, management, or disposal programs upon big game resources.